HyperSwitch Bene™

Powerful Image Processing With Simplified Operation

Third generation design

HyperSwitch Bene™ is a third generation of automated X-ray image processing with the ability to automate the detection of a wide range of defects, but at super-human speed with relentless consistency.

The design goal of ***HyperSwitch***™ was to harness the power of the modern computer, provide the ultimate in flexibility and adaptability while maintaining telecom class reliability. The real challenge is to do this all with simple, intuitive controls. Thanks to the intuitive operation, and the crash-proof reliability of our non-Windows™ operating system, our design will be welcomed by both management and production staff.

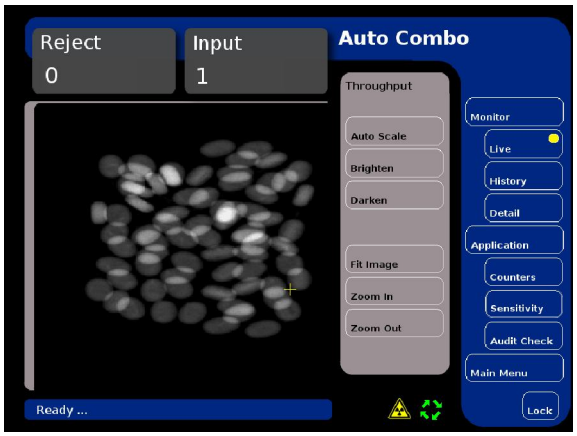
Automatic Training Setup

HyperSwitch Bene™ dramatically improves the state-of-the-art of x-ray inspection machines by utilizing neural network technology. This technology automatically learns what normal product should look like under the light of x-ray energy and detect undesired contamination such as stainless steel, glass, and stone. It also simultaneously inspects each product for under fill or weight. ***Bene***™ uses neural network technology to quickly determine what to expect. Contaminant and weighing capabilities no longer require trained personal to setup and adjust. ***Bene***™ simply learns what is normal by observation of "known good" examples. Placing the burden of setup and adjustment completely under the control of software enables unparalleled computing power to bear on the inspection task.

Bene™, Latin for 'optimization', is just one of the exciting features of this powerful x-ray inspection system. ***HyperSwitch Bene***™ improves reliability with enhanced system monitoring such as Preemptive Thermal Management, Safety Circuit Monitoring, and improved Software Audit Management.

Simple, Flexible, Powerful, Packaging Line Inspection

Perhaps the most potentially useful attribute of the ***HyperSwitch***™ system is the ability to recognize products by the image, and to instantly apply the appropriate detection parameters. This means that one system can be used on a multi product cartoning line without the need for an attendant to switch product parameters. This includes the ability to control an output sorting device.



No key board or pointing device. All operations are accomplished with an intuitive touch screen interface which has no menu structure to learn or remember.

HyperSwitch™ capabilities

This image processing platform is specifically designed for the automated inspection of products. This system can detect:

- **Foreign objects –** such as glass, stone, bone, metal, PVC plastic, etc.
- **Shape defects –** such as broken, deformed, etc.
- **Weight –** either whole product, or selected objects within the container.
- **Absence or excess of product –** such fill level, or overly compacted product.
- **Packaging defects –** such as open flap or missing spacer.
- **Object position –** such as missed or misplaced drilled hole or loose bearing.
- **Missing item** such as instructions or ingredient pouch.
- **Item count** even if parts overlap.

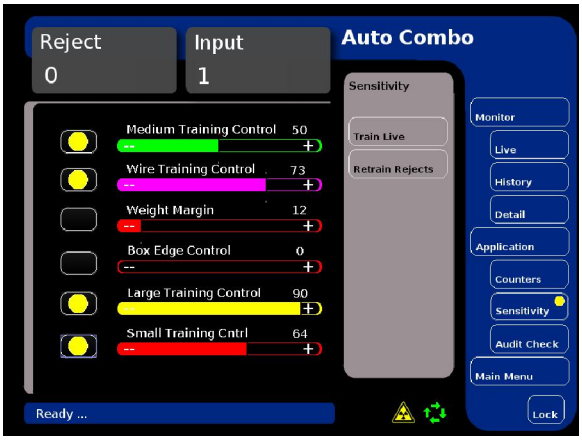
Novus X-Ray

HyperSwitch Bene™

The best hardware platform and operating system

It all starts with good bloodlines. The Intel Pentium platform has continuously out performed all others in terms of sheer performance while providing the best value for over 15 years.

HyperSwitch's™ use of Intel's Giga-hertz processors has given it the ability to implement very effective image operators, which identify features that only the human brain can match. The real-time operating system (QNX) has been used and improved for over 20 years in industrial/telecom applications, thus providing the best choice for highly reliable control of the Hyper-switch system. Of equal importance, QNX does not require special attention to shut-down and startup protocol, simple power-off and power on will suffice.

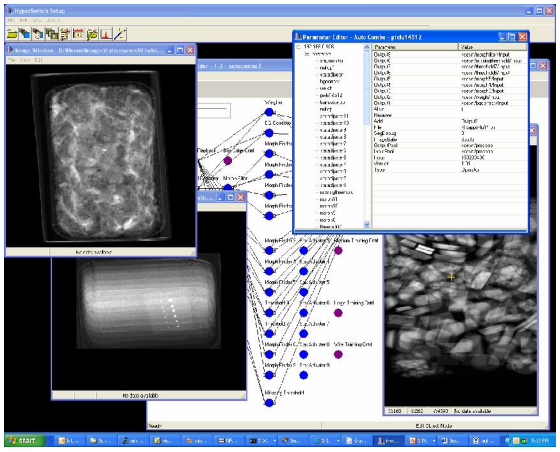


Algorithm complexities are simplified to a few training/sensitivity controls.

On-The-Fly algorithm selection

The best way to appreciate the ***HyperSwitch™*** architecture is to study the data path. Once the X-Ray image is extracted from the detector and fed into the computer, the image breaks into many simultaneous, parallel paths. Each path works to identify a very specific feature within the image. One of ***HyperSwitch's™*** innovations is the ability to create very complex paths with embedded decision points, which give it the ability to steer the image toward different operator groups. What does this mean in terms of yours application? … better detection statistics, and the ability to run mixed products on a packing line.

For example, it is perfectly feasible to run two product streams through the system, each with different products, and each with specific but different inspection parameters per product. ***HyperSwitch™*** is capable of recognizing each product for what it is, and applying the appropriate set of inspection parameters in real time. This includes the ability to simultaneously check weigh two different classes of product.



Hyper-Switch ™ uses a Windows-type of setup tool to allow the familiar consumer based protocols to be used for setup purposes.

High reliability and self-healing capability

Each piece of the ***HyperSwitch™*** program is an individual process that is completely separate and protected from others. These individual pieces can be tailored for your specific application and inserted without the risk of effecting the system's proven reliability. The compilation set of programs crafted for your specific task are continuously monitored for proper operation. In the rare event of failure, the effected piece will be logged and restarted automatically with only that specific functionality affected for the few milliseconds it took to identify and restart the process.

Building the system on top quality hardware to maximize reliability and enable the software to repair itself when a fault does occur means minimum down time for the customer!

Remote monitoring

Another amazing feature of the ***HyperSwitch™*** architecture is the ability for remote live monitoring and advance setup features on a remote computer. Normal operating features are best accomplished with an intuitive local touch screen interface, while advance setup and statistical functions are remoted to a full feature interface. Remote monitoring and product statistics is an inherent feature of the ***HyperSwitch™*** architecture!

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